when he touched it he saw that it was changed into a toad, which sprang upon his face and squatted there, and would not go away. When any one tried to take it off, it spat out poison and seemed about to spring in the face, so that at length nobody dared to meddle with it. Now this toad the ungrateful son was compelled to feed, lest it should feed on his flesh ; and with this companion he moved wearily about from place to place, and had no rest anywhere in this world." This very story is found in Etienne de Bourbon, 163, Bromyard, F. 22, Pelbartus, *Serm. de Temp. Hiem.*, 22, B, not to mention other works of the same class, which are mentioned in Oesterley's notes to Pauli, 437, and in Douhet, *Dictionnaire des Légendes*, col. 305, n. 158. Until quite recently Grimm's version was the only popular one known, but a version from Lower Brittany has lately been published by F. M. Luzel, *Légendes chrétiennes de la Basse-Bretagne*, Paris, 1881, vol. ii, p. 179, *Le Fils ingrat.* There are probably other popular versions which have not yet been collected, the class of legends or legendary and religious stories having been greatly neglected by collectors of popular literature. There is no need of insisting upon the importance of the *exempla* in the diffusion of stories, but we may mention in conclusion two cases of wholesale absorption of Oriental stories into collections of *exempla* or similar works. The first case is that of the *Disciplina clericalis* of Petrus Alfonsi, which has been taken up into the *Libro de Enxemplos* mentioned above ; the second is the Seven Wise Masters, a compend of which is found in the *Scala Coeli* of a Dominican monk, Joannes Junior, who lived in the middle of the XIV century, and wrote a work of the same general description as Bromyard's and Etienne de Bourbon's.* Separate stories from both of the above Oriental collections are frequently encountered among the popular tales of Europe, and their wide diffusion is doubtless due to their absorption into the above collections.

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## *The Latitude of Haverford College Observatory. By Isaac Sharpless.*

*(Read before the American Philosophical Society, April 6, 1883.)*

The latitude of Harverford College Observatory was determined in the year 1854, by Prof. Jos. G. Harlan, by the use of a transit instrument in the prime vertical. Imperfect records of his results and none at all of his computations remain, but from them he deduced a value of 40° 0′ 36.5″.

In the spring of 1881, a zenith instrument was placed in position in the observatory. The telescope has an aperture of $1\frac{3}{4}$ inches, and with its standards revolves about a vertical axis. It is provided with micrometer and levels.

* This compend of Joannes Junior is of great importance in the study of the Western branch of the Seven Wise Masters, and has been reprinted by K. Gœdeke in the *Orient und Occident*, iii, pp. 388–423, *Liber de septem Sapientibus.*

The latitude was determined by pairs of stars, one of each pair being north and one south of the zenith. The difference of the zenith distances was measured by the micrometer and the latitude calculated by the formula,

$$\varphi = \tfrac{1}{2}\,(\delta + \delta') + \tfrac{1}{2}\,(Z - Z')$$

As a preliminary work the value of a revolution of the micrometer screw was determined by observing the passage of a star between the wires set at some known distance apart, and multiplying the time by the factor $\frac{15 \times \cos \text{Dec}}{\text{Dist. between wires}}$. The mean of twenty-one observations was 111.6″.

A better result was obtained by the method of observing Polaris at time of greatest elongation. This time $T_0$ and the zenith distance $Z_0$ were first calculated and the telescope set at the latter angle. About twenty minutes before $T_0$ the movable micrometer wire was set in front of the star and the time of crossing recorded on the chronograph; the wire was then advanced one-fifth of a revolution, and the time again noted, and so on forty times. From these were obtained twenty values of a revolution of the screw. The computation is given in outline in the following table. The quantity $Z - Z_0$ was computed in each case by the equation :

$$Z - Z_0 = \sin\,(T - T_0) \cdot \frac{\cos\,\delta}{\sin 1''}$$

The level error was so slight that it was not taken into account ;

| No. | Micrometer Reading. | T. | | | T—$T_0$. | | | Z.—$Z_0$. | |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 6.80 | $6^h$ $50^m$ | $18.^s2$ | — | $21^m$ | $3.^s1$ | — | 433.59 |
| 2 | 6.60 | 51 | 16.2 | — | 20 | 5.1 | — | 412.68 |
| 3 | 6.40 | 52 | 33.2 | — | 18 | 49.1 | — | 387.70 |
| 4 | 6.20 | 53 | 34.2 | — | 17 | 47.1 | — | 366.55 |
| 5 | 6. | 54 | 40.9 | — | 16 | 40.4 | — | 343.59 |
| | etc. | etc. | | | etc. | | | etc. |
| 21 | 2.80 | $6^h$ 72 | 0.2 | + | 0 | 38.9 | + | 13.55 |
| 22 | 2.60 | 73 | 16.4 | + | 1 | 45.1 | + | 36.12 |
| 23 | 2.40 | 74 | 17.4 | + | 2 | 56.1 | + | 60.52 |
| 24 | 2.20 | 75 | 4.2 | + | 3 | 42.9 | + | 76.61 |
| 25 | 2. | 76 | 14.4 | + | 4 | 53.1 | + | 100.74 |
| | etc. | etc. | | | etc. | | | etc. |

Comparing the 1st observation with 21st, the 2d with 22d and so on, and dividing the results by 4, we obtain for the value of a revolution of the screw by this method the following :

| | | | |
|---|---|---|---|
| 111.78 | 111.25 | 113.04 | 109.92 |
| 112.20 | 110.71 | 113.98 | 112.66 |
| 112.05 | 111.28 | 113.26 | 112.76 |
| 110.76 | 110.67 | 112.78 | 111.88 |
| 111.08 | 111.59 | 112.25 | 111.16 |

The mean of these is 111.″9 and this is the value employed in subse-

quent work. The probable error of this mean by the method of least square is 0.″14.

The value of a level division was obtained by placing the movable micrometer wire on a terrestrial mark, and taking the reading, and again after the instrument was changed in altitude so as to cause the bubble to to move through a certain number of divisions. This gave it in micrometer revolutions, which were afterwards reduced to seconds. The result of a large number of determinations gave, as the most probable value, 6″.3.

The stars used were taken from the Nine Years Catalogue of Greenwich Observatory for 1872, the mean declinations calculated for the epoch 1881.0, 1882.0, or 1883.0, and the apparent declinations for the night of observation were obtained by the use of the "independent star numbers" of the American Nautical Almanac. The results were as follows:

| Date. | Catalogue No. of Stars. | | $\frac{1}{2}(\delta + \delta')$ | Micrometer Correction. | Level Correction. | Latitude. |
|---|---|---|---|---|---|---|
| 1881. | | | | | | |
| 10 mo. 26. | 62 | 77 | 40° 5′ 32″.99 | — 4′ 45″.85 | — 6″.72 | 40° 0′ 40″.42 |
| " | 2166 | 2185 | 40 0 56.29 | — 16.45 | + 3. | 42.84 |
| " | 48 | 51 | 39 56 22. | + 4 6.23 | + 10.5 | 38.73 |
| 10 mo. 27. | 48 | 51 | 39 56 22. | + 4 25.65 | — 8.1 | 39.55 |
| 11 mo. 15. | 2166 | 2185 | | | | 42.92 |
| " | 48 | 51 | 39 56 24.45 | + 4 19.83 | — 4.5 | 40.08 |
| 12 mo. 8. | 48 | 51 | 39 56 26.23 | + 3 57.26 | + 17.85 | 41.34 |
| 12 mo. 9. | 48 | 51 | 39 56 26.29 | + 3 57.57 | + 20.1 | 43.89 |
| 12 mo. 10. | 48 | 51 | 39 56 26.30 | + 4 1.59 | + 14.6 | 42.49 |
| " | 62 | 77 | 40 5 41.87 | — 5 13.27 | + 14.6 | 43.20 |
| 12 mo. 16. | 48 | 14 | 39 56 26.39 | + 4 30.50 | — 11.85 | 45.11 |
| " | 62 | 77 | 40 5 38.40 | — 4 43.65 | — 14.7 | 40.05 |
| 12 mo. 17. | 62 | 77 | 40 5 38.46 | — 4 50.65 | — 7.7 | 40.11 |
| 12 mo. 19. | 48 | 51 | 39 56 26.54 | + 4 24.07 | — 12.3 | 38.31 |
| " | 62 | 77 | 40 5 38.48 | — 4 50.16 | — 9.9 | 38.42 |
| 12 mo. 24. | 48 | 51 | 39 56 26.80 | + 4 16.86 | — 2.4 | 41.26 |
| " | 62 | 77 | 40 5 38.43 | — 4 51.5 | — 8.55 | 38.28 |
| 1882. | | | | | | |
| 1 mo. 27. | 567 | 569 | 40 6 16.17 | — 5 42.02 | + 5.78 | 39.93 |
| 1 mo. 30. | 530 | 550 | 39 59 51.73 | + 42.69 | + 3. | 37.42 |
| " | 567 | 569 | 40 6 24.03 | — 5 39.50 | + 6.13 | 38.40 |
| 2 mo. 1. | 530 | 550 | 39 59 51.44 | + 41.24 | + 6.45 | 39.13 |
| " | 567 | 569 | 40 6 15.67 | — 5 43.53 | + 3.80 | 35.94 |
| 2 mo. 8. | 530 | 550 | 39 59 58.19 | + 32.12 | + 12.6 | 42 91 |
| 2 mo. 10. | 530 | 550 | 39 59 58.27 | + 30.21 | + 9.88 | 38.36 |
| " | 567 | 569 | 40 6 22.28 | — 5 46.38 | + 3.3 | 39.20 |
| 2 mo. 11. | 530 | 550 | 39 59 58.31 | + 37.88 | + 8.85 | 45.04 |
| 2 mo. 14. | 567 | 569 | 40 6 22.00 | — 5 48.34 | + 2.55 | 36.21 |
| 2 mo. 17. | 530 | 550 | 39 59 58.60 | + 28.98 | + 8.85 | 36.43 |
| 11 mo. 5. | 2049 | 2070 | 40 0 59.76 | + 6.32 | — 22.05 | 44.03 |
| 11 mo. 9. | 2049 | 2070 | 40 0 59.645 | + 1.119 | — 20.217 | 40.55 |
| 12 mo. 8. | 2166 | 2185 | 40 1 15.573 | — 41.347 | + 2.0475 | 36.27 |
| 12 mo. 11. | 62 | 77 | 40 5 57.32 | — 5 30.944 | + 11.025 | 37.40 |
| 12 mo. 16. | 48 | 51 | 39 56 44.92 | + 4 24.307 | — 31.5 | 37.73 |
| 12 mo. 18. | 48 | 51 | 39 56 44.923 | + 3 36.582 | + 17.797 | 39.30 |
| 12 mo. 18. | 62 | 77 | 40 5 57.46 | — 5 36.966 | + 18.27 | 38.77 |
| 12 mo. 19. | 48 | 51 | 39 56 44.92 | + 3 37.5338 | + 18.1115 | 39.97 |
| 12 mo. 28. | 48 | 51 | 39 56 44.79 | + 4 5.7883 | — 13.86 | 36.72 |
| 12 mo. 28. | 62 | 77 | 40 5 56.813 | — 5 2.13 | — 17.64 | 37.04 |
| 1883. | | | | | | |
| 1 mo. 2. | 261 | 279 | 39 54 46.794 | + 6 5.913 | — 15.281 | 37.44 |
| 1 mo. 11. | 261 | 279 | 39 54 51.519 | + 6 10.366 | — 21.735 | 40.15 |
| 1 mo. 12. | 530 | 550 | 39 59 53.852 | + 54.495 | — 7.087 | 41.26 |
| 1 mo. 22. | 530 | 550 | 39 59 56.380 | + 50.243 | — 5.985 | 40.64 |
| 2 mo. 2. | 530 | 550 | 39 59 52.351 | + 1 6.02 | — 20.947 | 38.37 |
| 2 mo. 5. | 466 | 475 | 40 10 41.431 | — 10 19.478 | + 15.12 | 37.07 |

| Date. | Catalogue No. of Stars. | | $\frac{1}{2}(\delta + \delta')$. | | | Micrometer Correction. | | | Level Correction. | | Latitude. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1883. | | | | | | | | | | | |
| 2 mo. 5. | 489 | 495 | 39 | 58 | 56.523 | + | 1 | 12.567 | + | 31.815 | 39·91 |
| " | 530 | 550 | 39 | 59 | 56.002 | + | | 21.5061 | + | 22.68 | 43.19 |
| " | 567 | 569 | 40 | 6 | 19.803 | — | 6 | 5.969 | + | 23.153 | 36.99 |
| 2 mo. 8. | 466 | 475 | 40 | 10 | 44.976 | — | 10 | 11.925 | + | 3.78 | 36.83 |
| " | 467 | 475 | 40 | 12 | 12.959 | — | 11 | 37.301 | + | 3.78 | 39.44 |
| " | 489 | 495 | 39 | 58 | 55.198 | + | 1 | 41.325 | + | 3.15 | 39.67 |
| " | 530 | 550 | 39 | 59 | 56.306 | + | | 43 75 | + | 0.787 | 40.84 |
| " | 567 | 569 | 40 | 6 | 20.131 | — | 5 | 43.5889 | + | 3.15 | 39.70 |
| " | 577 | 591 | 39 | 51 | 35.175 | + | 9 | 9.149 | — | 3.44 | 40.88 |
| " | 578 | 591 | 40 | 5 | 10.217 | — | 4 | 27.16 | + | 3.44 | 39.62 |
| 2 mo. 9. | 466 | 475 | 40 | 10 | 44.976 | — | 9 | 9.373 | + | 7.56 | 43.16 |
| " | 489 | 495 | 39 | 58 | 55.198 | + | 1 | 40.150 | + | 3.44 | 38.79 |
| " | 567 | 569 | 40 | 6 | 20.1325 | — | 5 | 45.9948 | + | 7.245 | 41.38 |
| " | 682 | 710 | 39 | 56 | 19.1645 | + | 4 | 13.733 | + | 6.3 | 39.20 |
| " | 697 | 710 | 39 | 54 | 34.2665 | + | 6 | 1.493 | + | 6.3 | 42.46 |
| 2 mo. 12. | 466 | 475 | 40 | 10 | 44.041 | — | 9 | 46.635 | + | 7.56 | 41.97 |
| " | 489 | 495 | 39 | 58 | 55.782 | + | 1 | 33.044 | + | 6.615 | 35.43 |
| " | 530 | 550 | 39 | 59 | 56.5065 | + | | 41.1792 | + | 3.15 | 40.84 |
| " | 567 | 569 | 40 | 6 | 20.3575 | — | 5 | 43.309 | + | 2.3625 | 39.41 |
| " | 578 | 591 | 40 | 5 | 4.822 | — | 4 | 29.769 | + | 2.677 | 37.73 |
| " | 697 | 710 | 39 | 54 | 34.5405 | + | 6 | 10.165 | + | .945 | 45.65 |
| 2 mo. 13. | 466 | 475 | 40 | 10 | 44.041 | — | 10 | 13.547 | + | 6.15 | 37.11 |
| " | 567 | 569 | 40 | 6 | 20.3575 | — | 5 | 34.0215 | — | 9.135 | 37.20 |
| " | 697 | 710 | 39 | 54 | 34.5405 | + | 6 | 22.1385 | — | 14.49 | 42.18 |
| 2 mo. 23. | 530 | 550 | 39 | 59 | 57.113 | + | | 44.928 | + | .787 | 42 83 |
| " | 753 | 757 | 39 | 56 | 7.521 | + | 4 | 37.368 | — | 4.882 | 40.01 |
| 2 mo. 27. | 530 | 550 | 39 | 59 | 57.031 | + | | 44.20 | + | 3.1 | 44.33 |
| 3 mo. 8. | 812 | 822 | 39 | 54 | 18.609 | + | 6 | 28.125 | — | 2.047 | 44.69 |
| 3 mo. 13. | 779 | 812 | 40 | 0 | 26.399 | + | | 3.357 | + | 11.496 | 41.27 |
| " | 779 | 834 | 39 | 53 | 53.759 | + | 6 | 35.276 | + | 11.025 | 40.06 |
| " | 779 | 859 | 39 | 56 | 43.715 | + | 3 | 47.381 | + | 7.718 | 38.81 |
| 3 mo. 14. | 812 | 822 | 39 | 54 | 19.105 | + | 6 | 24.096 | | | 43.20 |

The mean of these 76 results gives the latitude of the Observatory

40° 0′ 40.085.

Assuming them all to be of equal weight, the probable error of a single observation is 1.706″ and of the final result .191″.

NOTE.—The value of the longitude of the Observatory, standing on our books, but obtained, we do not know how, is 6m. 59.3 sec. East of Washington. At the time of the Transit of Venus, Washington time was telegraphed to our railroad station, distant one-half mile from the Observatory and compared with our local time. The mean of three days' comparisons gave a difference of 6m. 59.6 sec.

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## *On a Crinoid with Movable Spines. By Henry S. Williams.*

*(Read before the American Philosophical Society, April 20, 1883.)*

Among the rarer forms of the second fauna of the upper Devonian, at the base of the Chemung group, Ithaca, N. Y., is a Crinoid with some interesting features.

In its general characters it agrees with the family *Platycrinidæ* of Rœmer, and falls under the section *Hexacrinites* as defined by Wachsmuth and Springer in Revision of the Palæocrinoidea, Pt. II, p. 56.